MN STEM Ecosystem

The Minnesota STEM Ecosystem was created through a cross-sector, cross-system collaboration of business and industry, K12 and higher education, government, afterschool STEM learning programs, museums, non-profit and community organizations, policy leaders.

The Minnesota STEM Ecosystem supports STEM learning and workforce development across sectors and systems to build and coordinate statewide learning strategies, aligning after-school and in-school STEM learning outcomes.

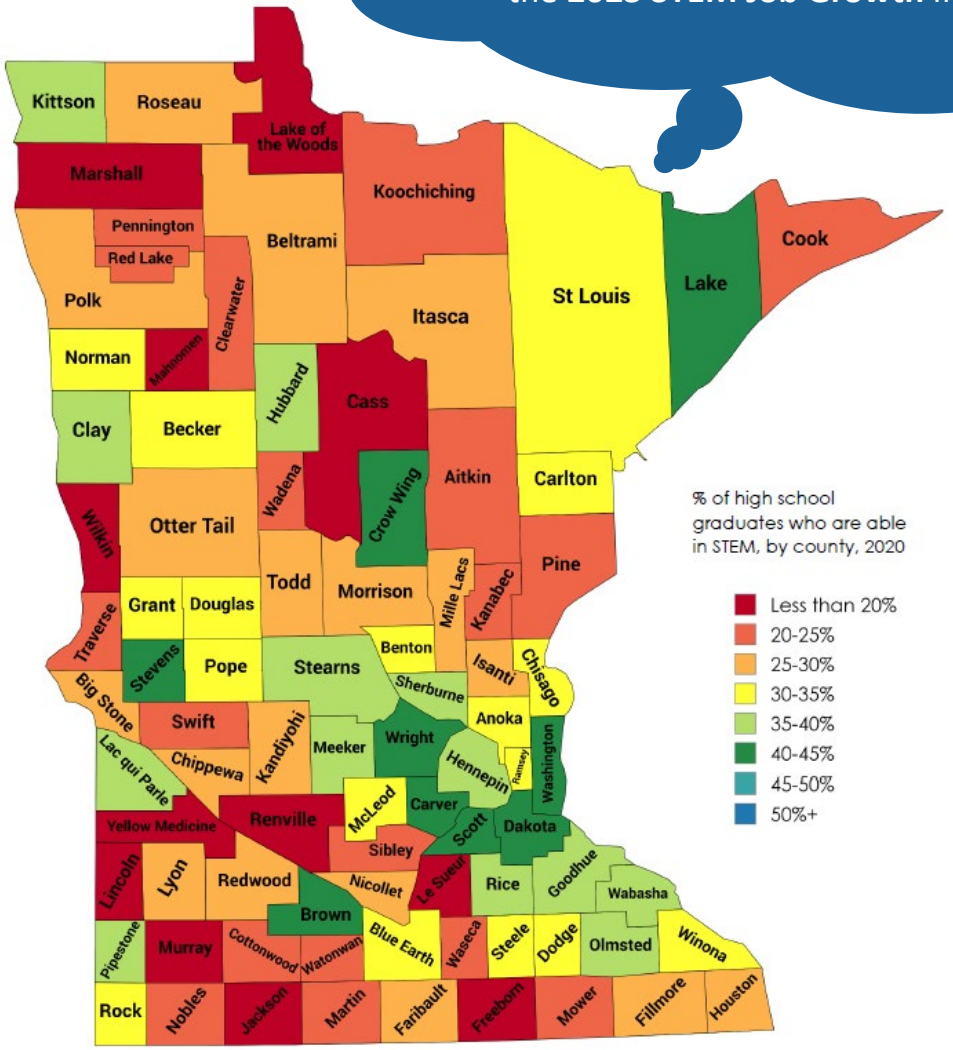
MINNESOTA
STEM
ECOSYSTEM


Business & Industry
STEM Learning Programs
Higher Education
K12 Education
Museums & Libraries
Community & Cultural Organizations
CTE
MINNESOTA
STEM
ECOSYSTEM

Is Minnesota STEM Ready?

20% of jobs in Minnesota are in a STEM profession and in 2022 **40% of job openings** were STEM-based.[1]

Minneapolis-St. Paul was ranked 11th in the nation on the **2023 STEM Job Growth** Index![2]



ACT data by county collected by Minnesota Compass; this data ceased to be collected in the same way during or following the COVID19 pandemic. However, in **looking statewide at the MCA [MN Comprehensive Assessment] for 2024, less than 35% of all high school juniors (11th grade) were proficient in grade level math.**

1 Mn Dept of Employment & Economic Development
2 STEMdex, RCLO

Building Regional STEM Networks

MINNESOTA
STEM
ECOSYSTEM

Our STEM Community of Practice

Bringing together in-school and after-school STEM-based program providers, including cultural and community-based organizations and business and industry to build a place-based Community of Practice to better serve STEM learners.

- ✓ Building a regional STEM asset map. *Identifying STEM assets within each region*.
- ✓ Hosting a (regional) Community of Practice meeting to encourage collaboration and better understand the connections between "assets" within the community (region).
- ✓ Building strategies that can serve as tools/resources for future implementation in years 2 and beyond in other regions, with a focus on identifying gaps.
- ✓ Creating an innovation project related to the process of STEM Asset Mapping.

Creating Regional STEM HUBS

Identify Assets

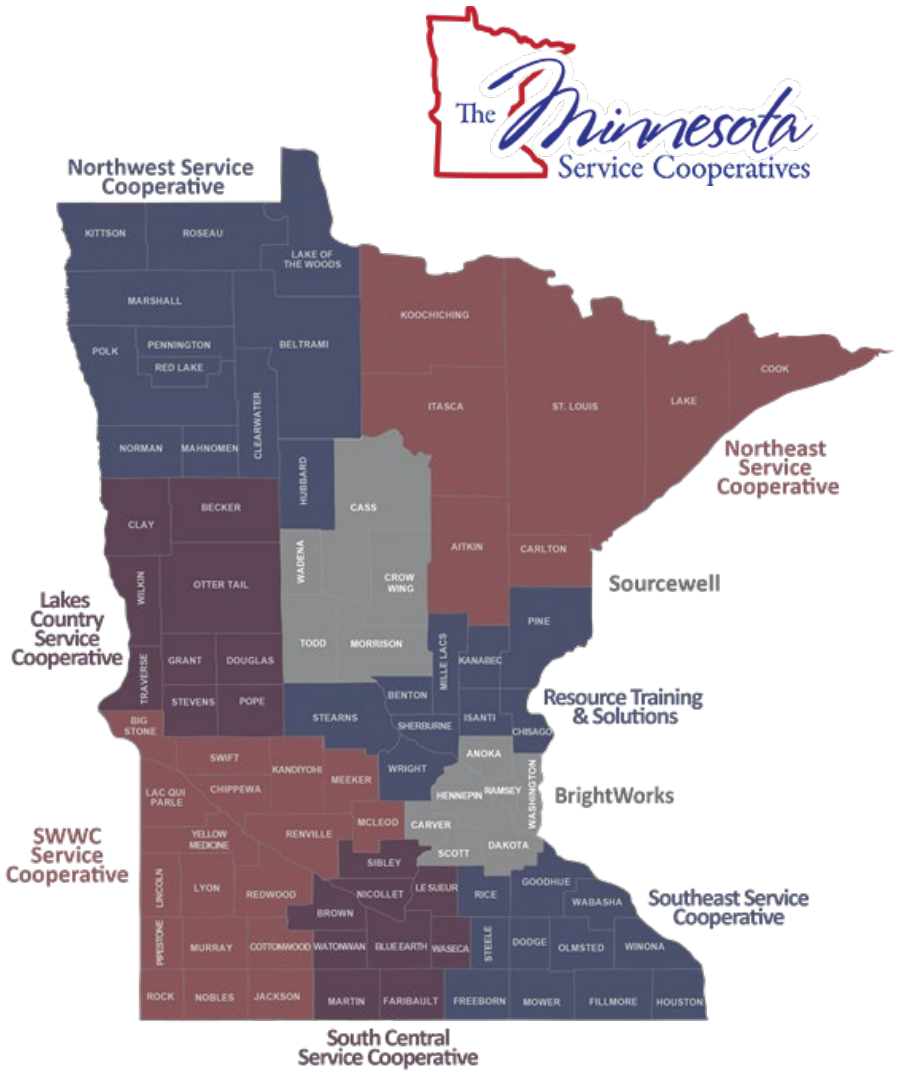
- **Taking Inventory** of existing regional STEM assets.
- **Identifying** Gaps in STEM learning and workforce needs.

Build Structure

- **Hosting** Regional STEM meetings bringing together industry and education.
- **Proposing** place-based strategies for enhancing STEM education aligned with workforce needs.

Create Strategies

- **Building** programs and initiatives with a focus on scalability and braided funding.
- **Integrating** cross-sector programming designed to bridge learning and the workforce.



ACCESS TO STEM: A FRAMEWORK

CREATING SPACE FOR ALL LEARNERS

stemOnext OPPORTUNITY FUND

MILLION GIRLS MOONSHOT

Strategies are the broad categories within each large concept: **Increasing Access, Youth-Centric, and Skill Development.**
Tactics are the specific actions and tools for each strategy.

INCREASING ACCESS

Strategies that address barriers to participation and build on the experiences within the community.

Strategies	Tactics
Community Engagement	• Create plans for internal and external communication and outreach • Build cross-sector partnerships to cultivate a STEM learning ecosystem • Offer community and family engagement opportunities
Data Informed Decision Making	• Identify ways to collect youth and program level data to improve program quality • Collect feedback from youth and families • Conduct evaluation to assess broader community needs
Program Design (quality and intentionality)	• Involve stakeholders who represent the community and offer diverse perspectives in program design • Form an advisory board with key stakeholders to provide ongoing guidance and feedback • Be intentional in program design to engage and effectively serve all youth
Program Operations	• Ensure all youth have access to programming (location, schedule, transportation, technology) • Ensure all youth feel welcome (broad outreach to diverse populations, marketing designed to engage all youth, welcoming environment) • Recruit and retain staff who are representative of the community

YOUTH-CENTRIC

Strategies that build on the specific strengths, needs, and challenges of youth.

Strategies	Tactics
Peer Support	• Provide a supportive environment for all youth • Encourage positive peer connections • Help all youth feel they are part of a STEM community
Positive Youth Development	• Support all youth to make personal connections to and a greater sense of belonging in STEM • Help all youth develop self-efficacy and confidence in STEM • Elevate all youth voice and choice
Relevance	• Connect programming to school, home, and other settings • Leverage all youth interests, knowledge, and lived experiences • Show how STEM can make a difference in youth's lives and in their communities
Supportive Relationships	• Make community and family connections • Provide opportunities to interact with and learn from diverse STEM role models • Recruit and retain staff skilled in developing and supporting positive relationships

SKILL DEVELOPMENT

Strategies that are personally relevant to youth and enable them to develop STEM and 21st century skills.

Strategies	Tactics
Connected Pathways	• Provide opportunities to learn about and explore a variety of STEM careers • Curate partnerships with other STEM programs to encourage further participation • Provide exposure to relatable STEM role models who have experienced diverse career pathways
Curriculum	• Foster engineering mindset practices (applying math and computer science) • Create a learning environment that offers voice and choice to engage all youth in STEM • Provide opportunities for all youth to do authentic practices that STEM professionals do
Professional Development (for the field)	• Provide opportunities for educators to reflect on their own lived experience • Provide training for educators to make STEM personally relevant to all youth • Engage educators in MGM professional development offerings (role models, engineering mindset, growth mindset, etc.)
21st Century Skills	• Provide opportunities to collaborate and develop collaboration skills • Ask open-ended questions to help youth critically think and deepen their understanding • Facilitate development of a growth mindset

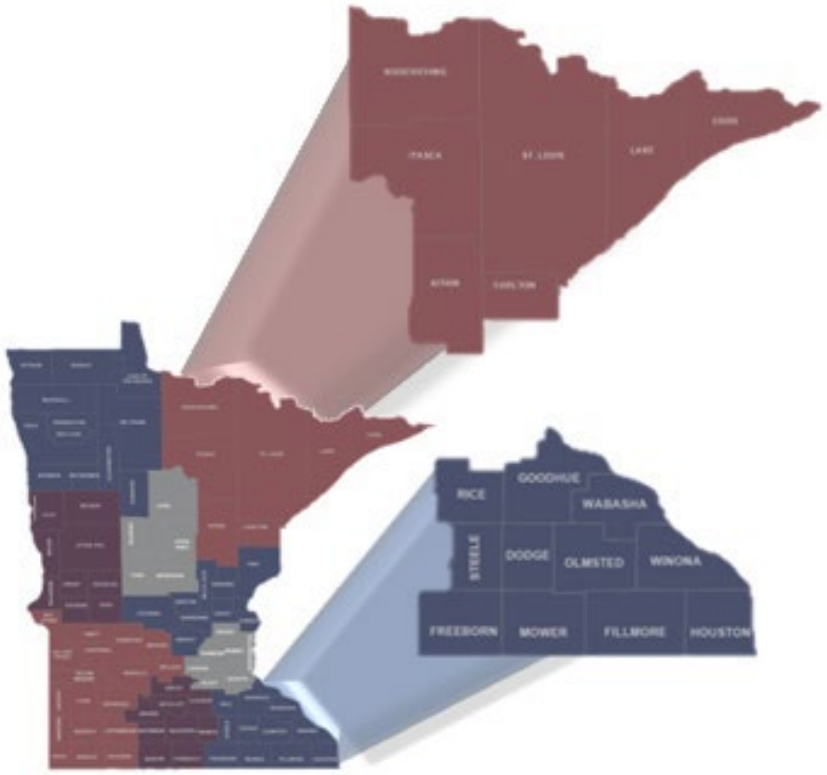
Created for STEM Next Opportunity Fund by the National Girls Collaborative Project

NGCP 20 YEARS TRANSFORMING STEM

VERSION 06/15/2022

SOUTHEAST and NORTHEAST STEM Joy

- In the Southeast and Northeast regions, as part of a collaboration with the Science Museum of MN; the equity-centered **STEM JOY pedagogy was piloted with the Southeast Service Cooperative STEM Forward program and in the Northeast with the Northern Lights Collaborative STEM Network.**
- For too long, formal STEM educators, after-school STEM program providers, and youth-based STEM employment program providers have operated in silos. STEM JOY was designed to bridge these gaps and be relevant for all partners within the STEM learning space.



STEM FORWARD

Southeast Service Cooperative

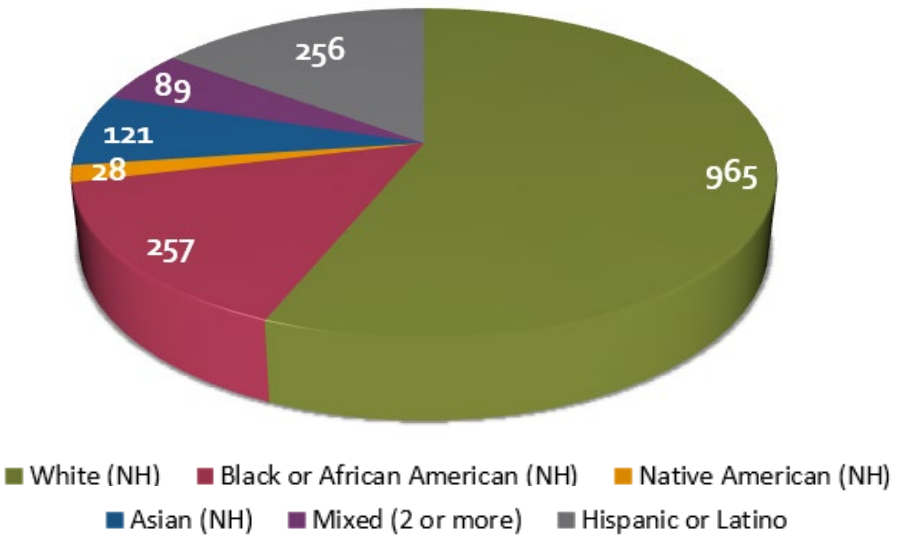
Science Museum of Minnesota

Northern Lights Collaborative for Computing Education

University of Minnesota

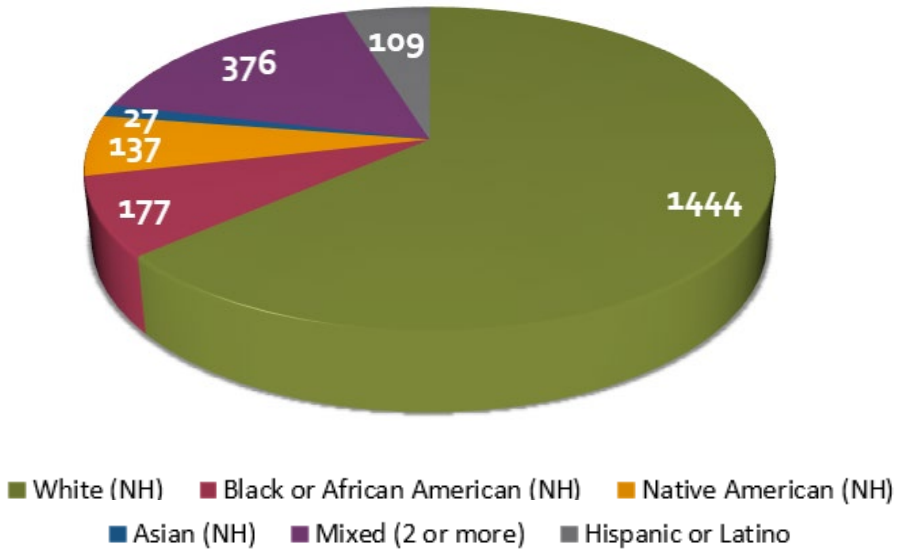
IMPACT: Southeast

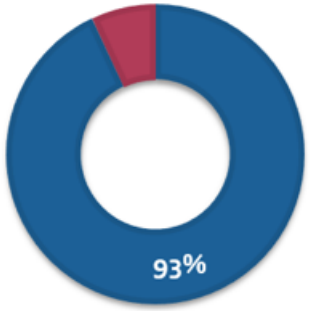
- The STEM JOY training occurred on February 6, 2024; February 13, 2024 and February 20, 2024, for 4 hours of structured training each day.
- The SE cohort included 18 registrants: 11 formal educators representing elementary, middle, and high school populations within the region; 4 STEM-based after-school program providers; and 3 youth STEM-based employers serving the southeast region.
- Based on the interactions of the participants, the STEM JOY training will more than 1800 young people:
  - 510 High School Students (grades 9-12)
  - 400 Middle School Students (grades 6-8)
  - 925 Elementary School Students (grades K-5)



IMPACT: Northeast

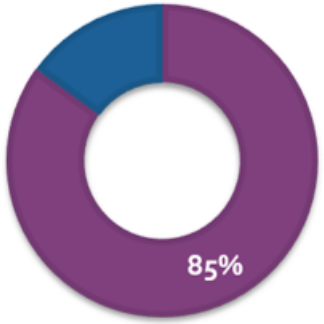
- The STEM JOY training occurred on July 22-14, 2024, for 4 hours of structured training each day.
- The NE cohort included 23 registrants: 10 formal educators representing elementary, middle, and high school populations within the region; 11 STEM-based after-school program providers; and 2 youth STEM-based employers serving the southeast region.
- Based on the interactions of the participants, the STEM JOY training will more than 2000 young people:
  - 1320 High School Students (grades 9-12)
  - 500 Middle School Students (grades 6-8)
  - 750 Elementary School Students (grades K-5)

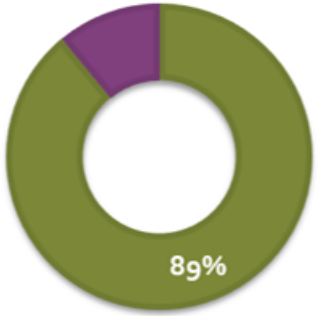




Over 93% of the participants agreed or strongly agreed: The ideas and concepts we explored in this program felt relevant to me. **This high level of agreement indicates that the training content resonated well with the participants, addressing their needs and interests effectively.**

Over 85% intend to apply the ideas and concepts within this training. **This intention to apply the training highlights the practical value and immediate applicability of the program content, suggesting a strong likelihood of lasting impact.**



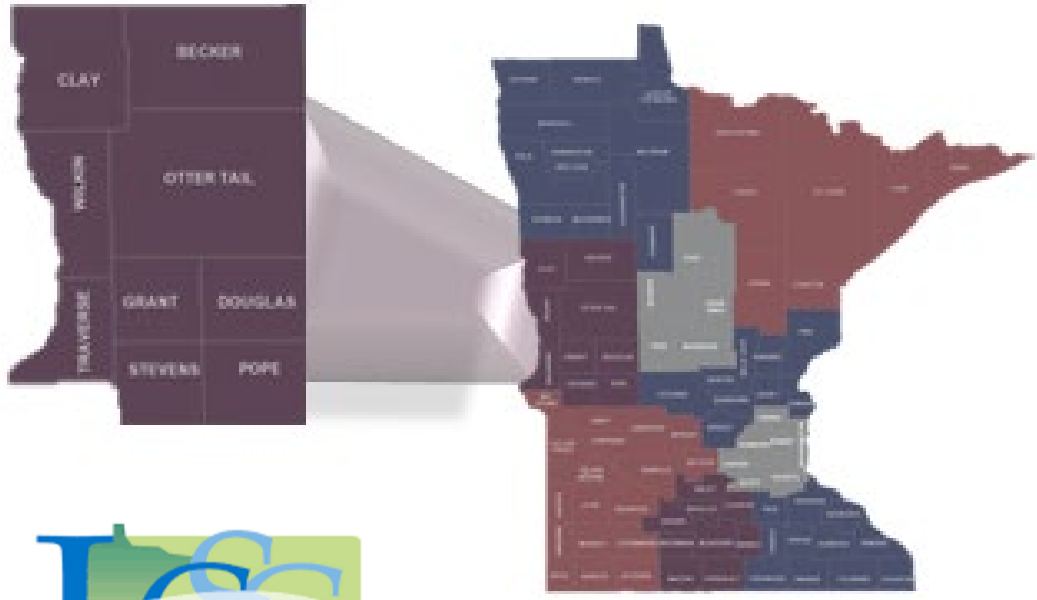


Over 89% of the participants agreed or strongly agreed: I feel confident that I can apply the ideas and concepts we explored in this program to my work going forward. **The training not only provided theoretical knowledge but also empowered participants with practical skills and confidence to implement what they learned.**

THE INTERSECTION OF STEM, REPRESENTATION AND INCLUSION

WEST CENTRAL
STEM Day at the Fair

- In the West Central region, Lakes Country Service Cooperative hosted the inaugural **STEM Day at the West Ottertail County Fair** on July 19!
- A broad range of industry and community organizations participated, each providing unique, **hands-on activities that were both educational and entertaining**.
- This marked the first time in the fair's history that main gate **admission was free, thanks to sponsorship from a local car dealership.** As a result, attendance soared, attracting a diverse crowd eager to explore STEM concepts.



LAKES COUNTRY
Service Cooperative
Together we achieve

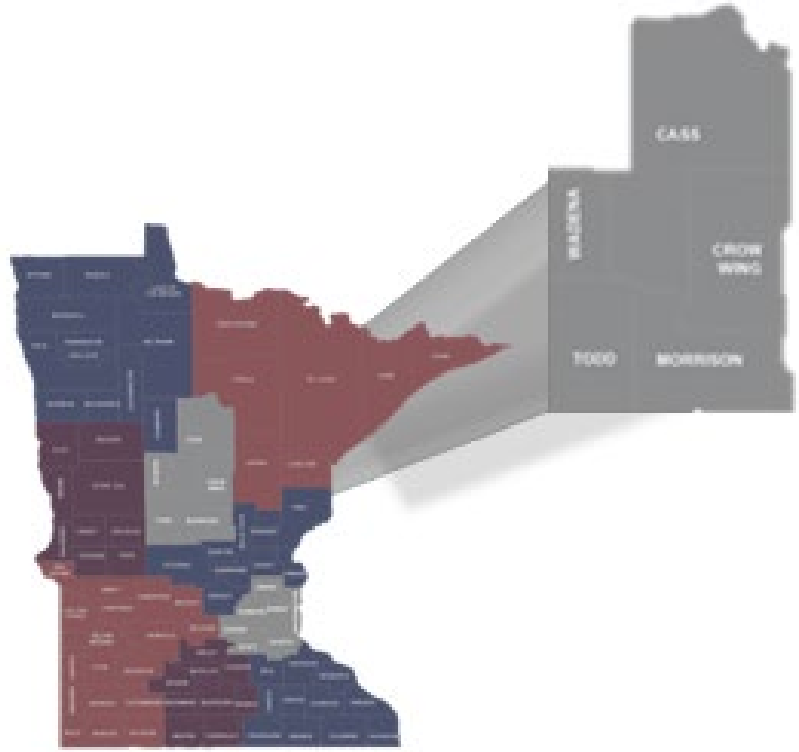
IMPACT

- Attendees had the opportunity to build simple machines, experiment with coding, explore robotics, and even delve into the world of ham radios. From seed bombs to a hands-on recycling plastic project, the activities offered something for everyone—whether young children just beginning to discover STEM or adults with a keen interest in these STEM related activities.
- Six groups participated in STEM Day, each providing unique, hands-on activities that were both educational and entertaining. The participating organizations included:
  - Bell Museum
  - Fleet Farm
  - K0QIK Lake Region Amateur Radio Club
  - Otter Cove Children's Museum
  - Otter Tail County Recycling Center
  - Lakes Country Service Cooperative


Coke
Little Bites: Bubble Blower

CENTRAL
Lure Masters: Designing the Ultimate Catch!

- In the Central region, the Sourcewell Service Cooperative hosted the inaugural **Lure Masters: Designing the Ultimate Catch** on Sept. 20 on Gull Lake!
- In collaboration with a local tour guide and the DNR, students engaged in an immersive experience that combined the NGSS 3D curriculum with the rich Indigenous knowledge of fishing in Central Minnesota.

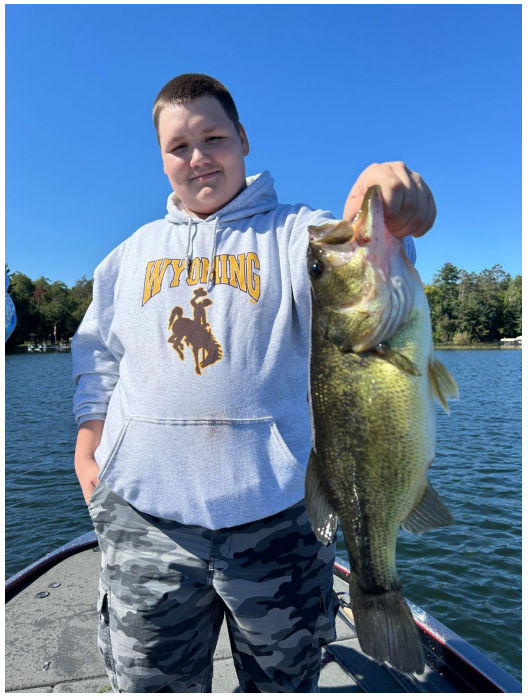


DEPARTMENT OF NATURAL RESOURCES

Sourcewell

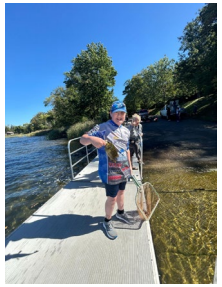
IMPACT

- The project bridged the Brainerd Learning Center (BLS) Alternative Program with STEM and community career opportunities by integrating technology and local expertise in fishing.
- Through science lessons focused on the anatomy and physiology of local fish, students deepened their understanding of the natural world while researching and designing their own 3D-printed fishing lures.
- The project culminated in the hands-on experience on Gull Lake, where students tested their custom lures and explored the latest technology used on fishing boats, gaining insight into potential career paths in the field.

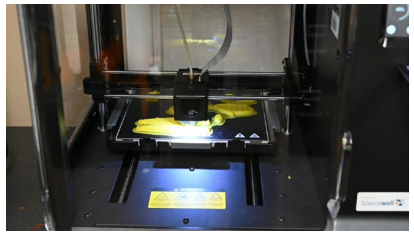
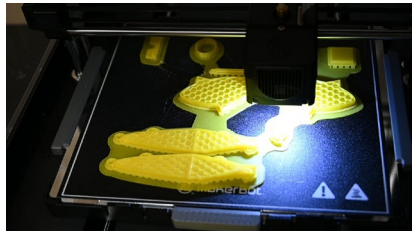





RAFT
ON
LEAN IN
EAN OUT





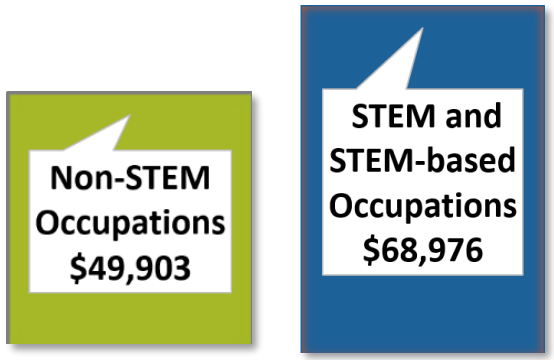


Bridging the Gap:
Connecting STEM Learning to the Workforce

MINNESOTA
STEM
ECOSYSTEM

The STEM Opportunity Gap

- On average STEM and STEM-related occupations pay on **average $20,000 a year MORE than non-STEM occupations.**(1)
- **Minneapolis-St. Paul** was ranked 11th in the nation on the **2023 STEM Job Growth** Index.(2)



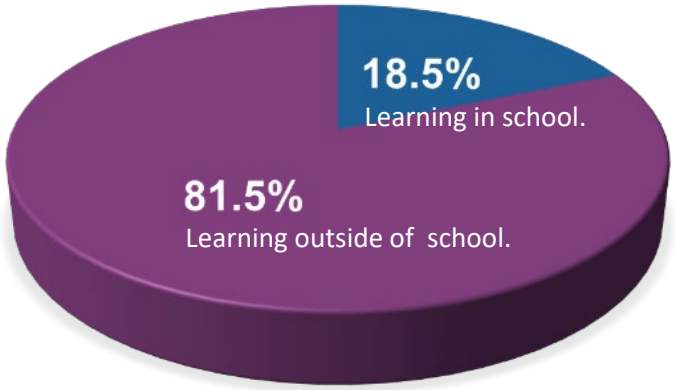
- Over the next 10 years, STEM and STEM-related occupations will grow at a rate of more than 12%!(3)

- **20% of jobs in Minnesota** are in a STEM profession and in 2022 **40% of job openings** were STEM-based.(4)

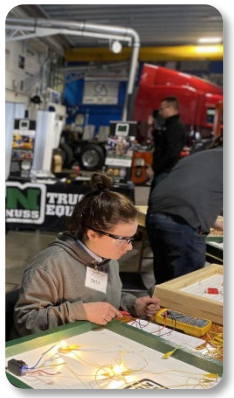
1 The National Science Board- The STEM Labor Force
2 STEMdex, RCLO
3 US Bureau of Labor and Statistics
4 Mn Dept of Employment & Economic Development

Reinforcing STEM Learning Outside the Classroom

- More than 80% of learning is done outside of the classroom! (1)
- 81% of students believe experiential, **industry-based learning experiences** are important.(2)



- 70% of Minnesota students are engaging in STEM learning in after school programs.(3)
- For every young person in an after-school program in Minnesota, there is one waiting for a space.(3)



1 LIFE Center's Lifelong and Lifewide Diagram
2 The National Science Board- The STEM Labor Force
3 Afterschool Alliance, Minnesota

Ensuring classroom learning is reinforced with applied learning in OST activities and aligned with workforce needs.

Many of the career areas are STEM and STEM related. The updated wheel now incorporates emerging technology into all of the fields.

Digital Technology:
IT Support & Services
Autonomous Technology
Cybersecurity
Data Science
AI

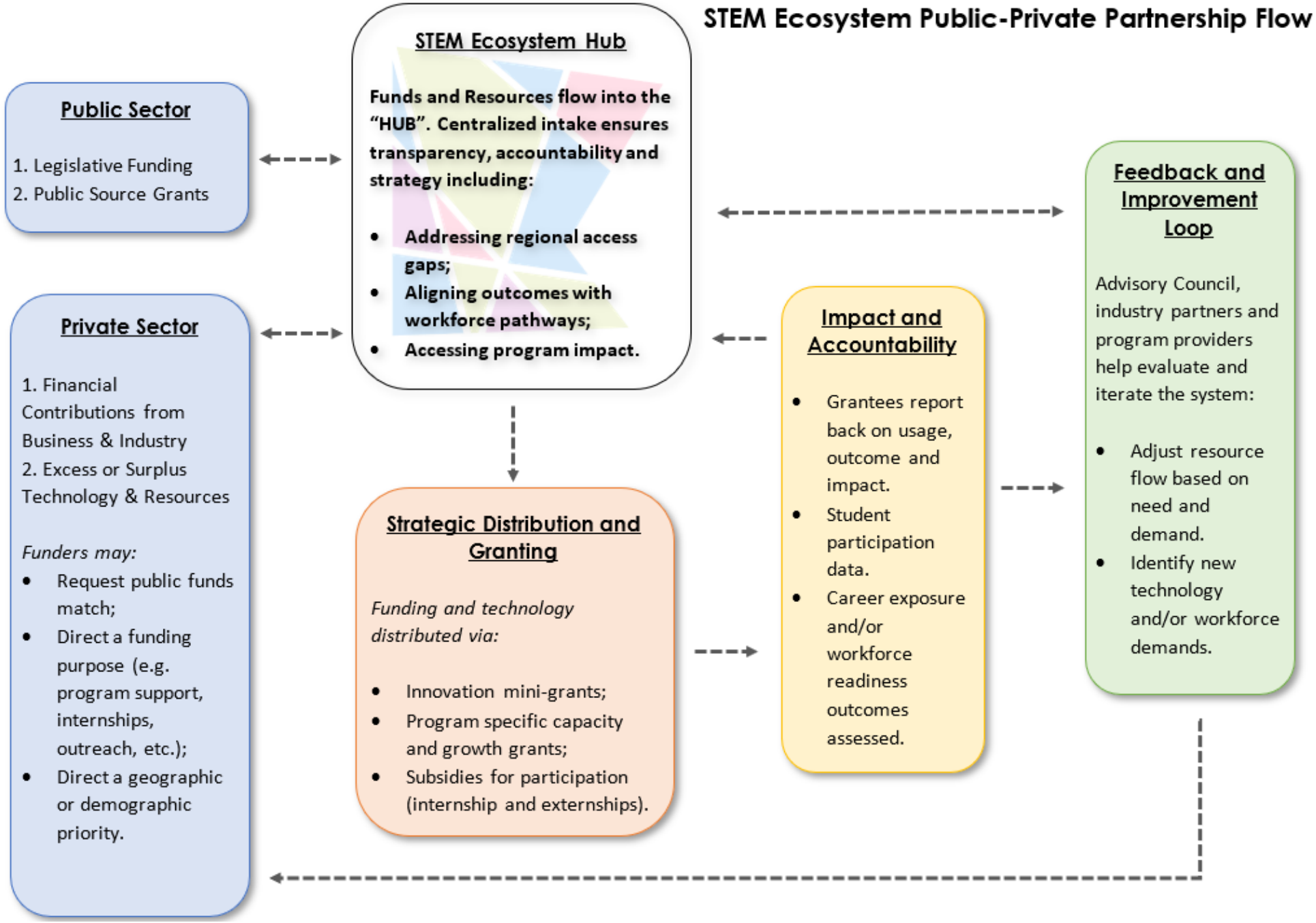
Building Collaborations: Our Learning Partners

The Power of Public-Private Partnerships

- **Align Learning with Workforce Needs:** Industry input helps educators tailor STEM curricula to reflect current technologies, tools, and skills that are in demand. Students are more likely to gain relevant, job-ready skills when education is aligned with actual workforce requirements.
- **Provide Access to Resources and Expertise:** Businesses often contribute equipment, software, or funding that schools may not otherwise afford. Industry professionals can serve as mentors, guest speakers, or project collaborators, exposing students to real-world STEM careers.
- **Support Work-Based Learning Opportunities:** Internships, apprenticeships, job shadowing, and micro-internships offer students hands-on experience in professional environments. These experiences build employability skills, career awareness, and confidence.
- **Inspire and Motivate Students:** Seeing real people working in STEM careers—especially those from similar backgrounds—can help students envision their own future in STEM. Industry challenges and competitions give students purpose and excitement about applying what they learn.
- **Foster Innovation and Collaboration:** Industry-education partnerships encourage interdisciplinary projects that mirror real-world problem-solving. Students learn collaboration, communication, and innovation—skills that are essential in the 21st-century workforce.
- **Build a Talent Pipeline:** For industries facing labor shortages, partnerships help create a local talent pipeline. Early engagement ensures students are aware of and prepared for careers in high-demand fields like advanced manufacturing, IT, and healthcare.

Building Collaborations: Industry Partners

STEM Ecosystem Public-Private Partnership Flow



This past year, Medtronic generously donated 300 [Quest 2] Oculus headsets that were distributed to several educational cooperative lending libraries, after-school STEM learning programs.

- These learning tools can level the playing field by providing students from diverse backgrounds, including those in rural or underserved areas, access to high-quality STEM and CTE learning experiences that they might not have access to in traditional settings.
- By leveraging the resources and networks of public and private sector partners, collaborations can reach more students, particularly Greater Minnesota, and provide them with opportunities they might not otherwise have.

Building Programs that Work

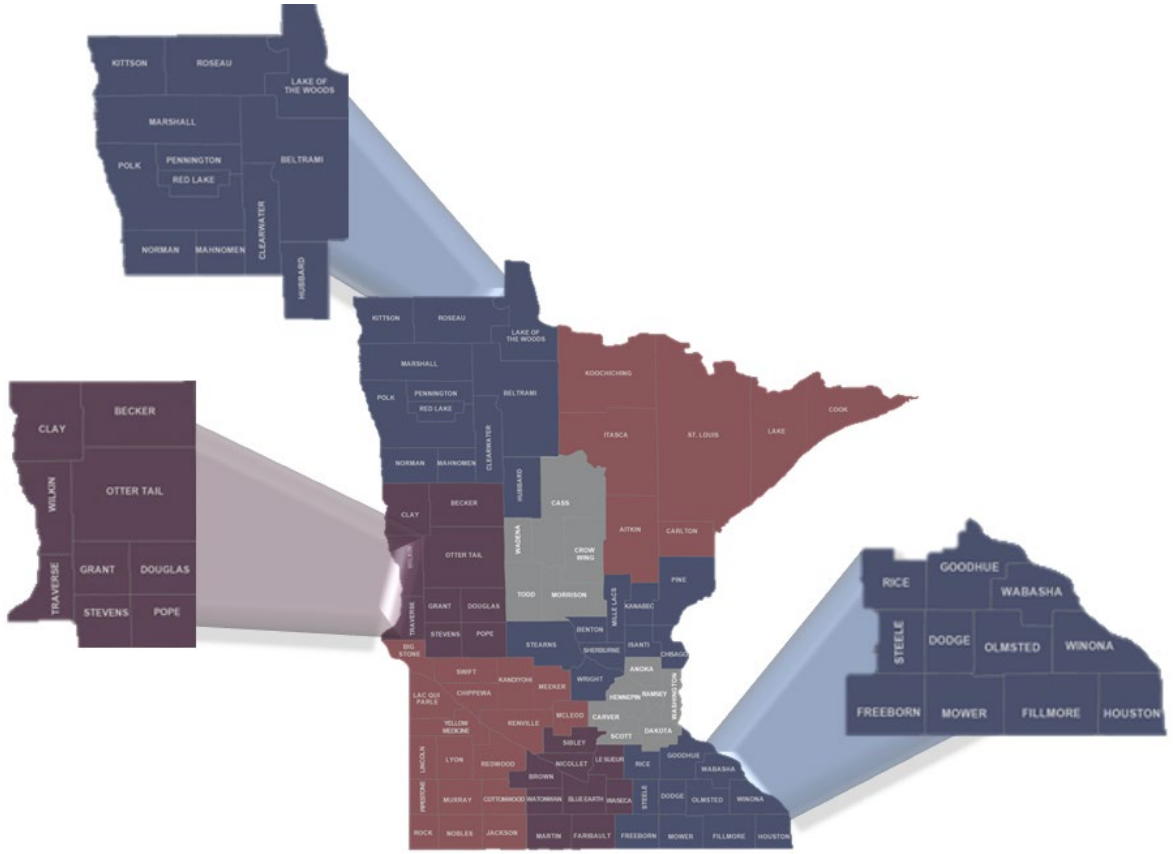
MINNESOTA
STEM
ECOSYSTEM

Robotics, Internships and Career Exploration

The MN STEM Ecosystem was able to leverage partnerships and existing resources to develop a collaboration with High Tech Kids, the Engineering and Advanced Manufacturing Centers of Excellence and the Service Cooperatives for the following project:

- Lean Learning Lab to introduce young people to STEM careers;
- Supports micro and immersive internships engaging students in “real world” hands-on experiences;
- Expanding robotics teams across the state!

STEM Internships



MINNESOTA STATE
Advanced Manufacturing Center of Excellence

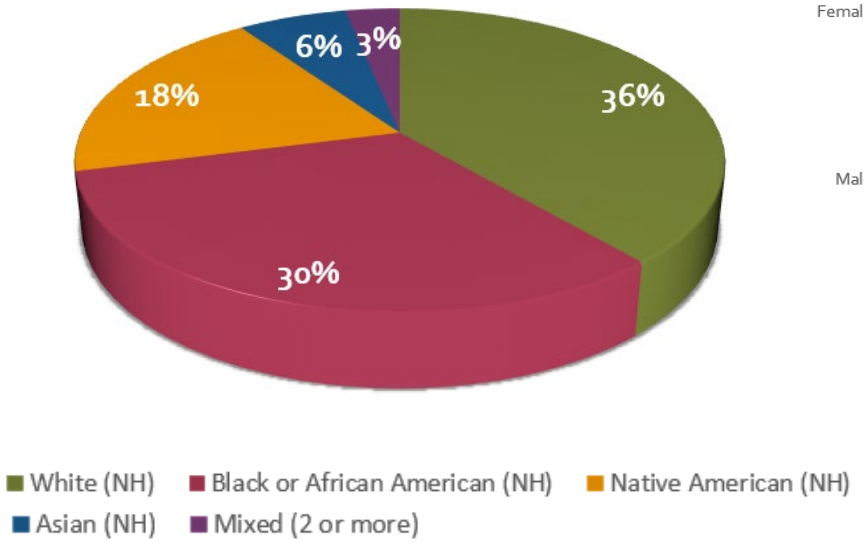
Southeast Service Cooperative

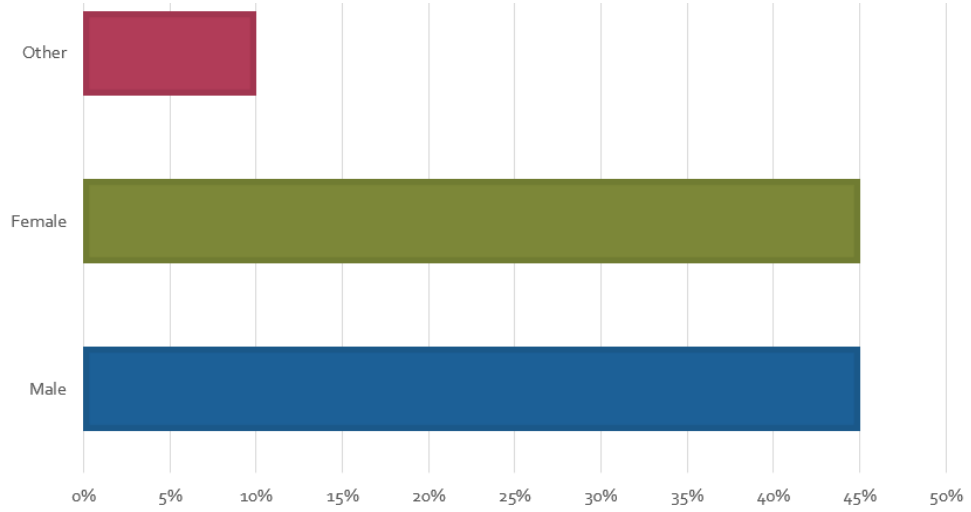
LAKES COUNTRY Service Cooperative
Together we achieve

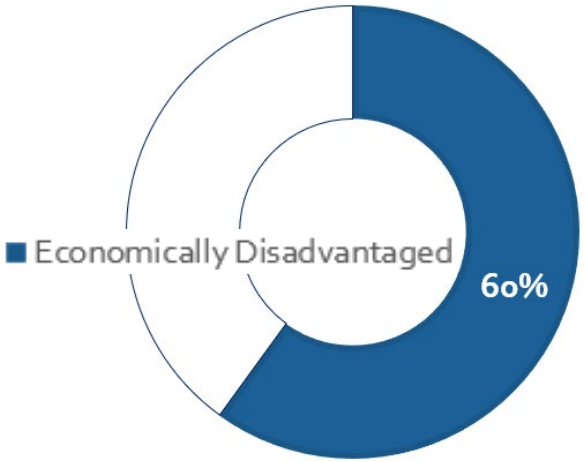
Workforce Development

- Micro-internships: (10-20 hours), project-based assignments. Micro-internships are an accessible way to explore STEM-based career paths while developing employability skills.
- Immersive internships and work-based learning: (30+ hours) Providing students, who are already knowledgeable in a particular STEM area, real-world, practical experience in their chosen field prior to graduation.

Snapshot of Internship Participation





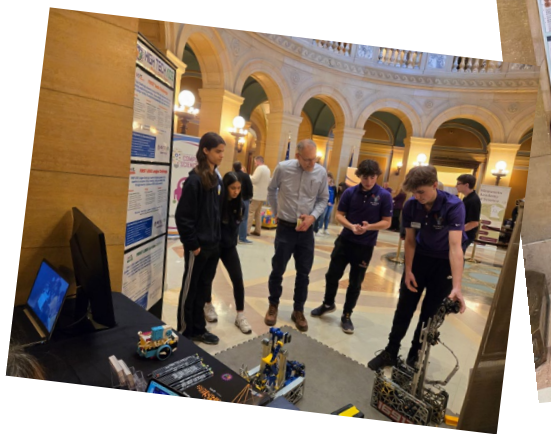


Awareness and Advocacy

MINNESOTA
STEM
ECOSYSTEM

STEM Day at the Capitol

MINNESOTA
STEM
ECOSYSTEM

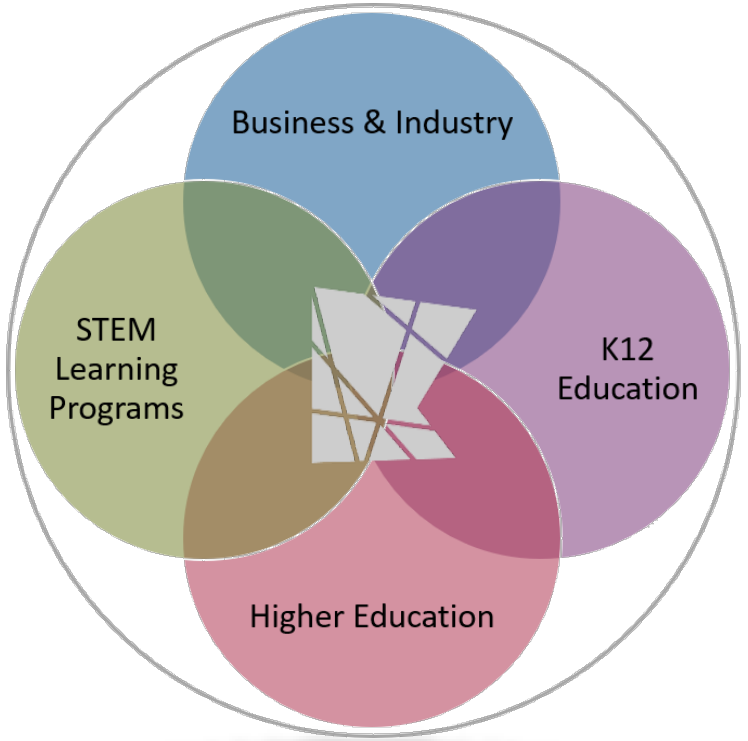


The MN Advisory Council on STEM Learning and Workforce Development

The Advisory Council on STEM Learning and Workforce Development provides a platform for developing a unified vision and strategic approach to STEM education and workforce development across the state.

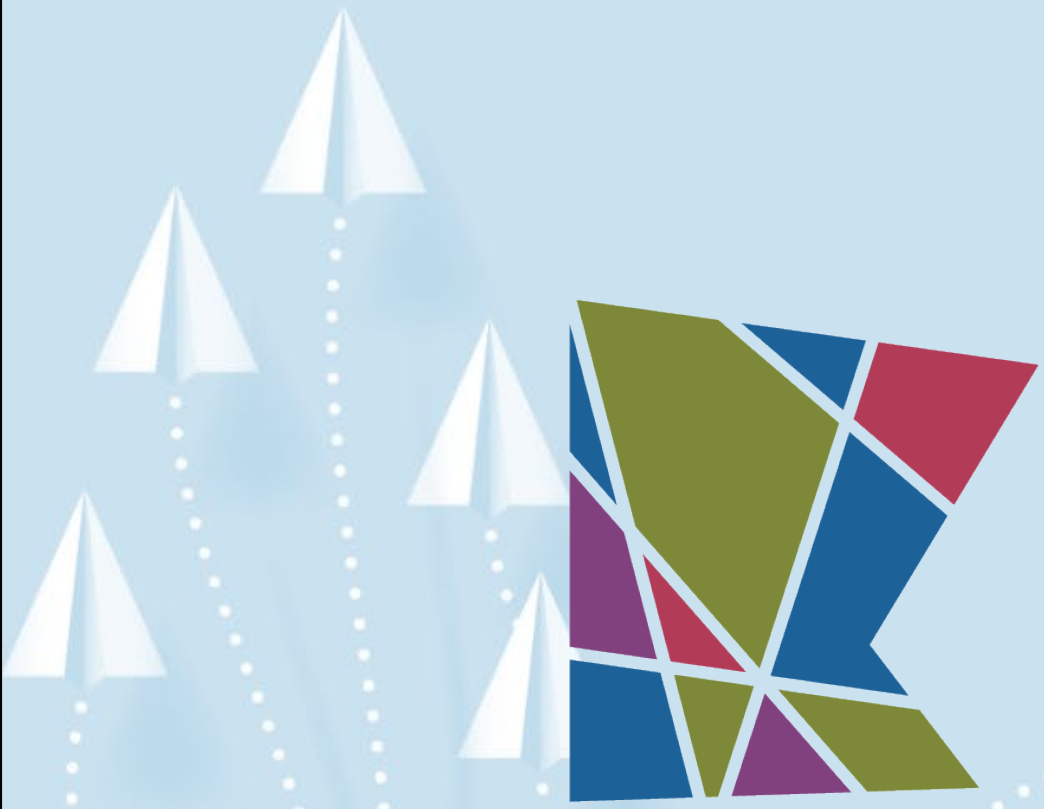
The Council aims to increase access to STEM learning and workforce opportunities across Minnesota, particularly in regions and communities that are underserved.

The Council is more than just a collaborative body—it is a catalyst for change. Its work will not only help to close STEM opportunity gaps but will also ensure that Minnesota leads in STEM innovation and excellence.



Moving Forward: 2025 Initiatives

Technical & Workforce Skills	**CS/IT Summer Camp:** (Tech Corps from Ohio) partnership with MN Tech Network & IT Center of Excellence.
Workforce Development	**STEM Internship Program**: Ongoing through **2026**, with potential legislative funding for expansion.
STEM Together Series	**Community of Practice:** (June, August 2025) Focused on identifying Program Learning Outcomes and Workforce Alignment.
Regional Networks	**Continuation of Asset Mapping:** Focused on **Southwest, Northwest & Metro MN** regions.
Emerging Technology Pedagogy	**Educator Externships:** Partnership with MN State Centers of Excellence & Industry.
MN STEM Convening 2025	**Statewide STEM Convening:** Similar structure to 2024, with a focus on bringing together industry, education and OST organizations.



MINNESOTA STEM ECOSYSTEM

stemmn.org